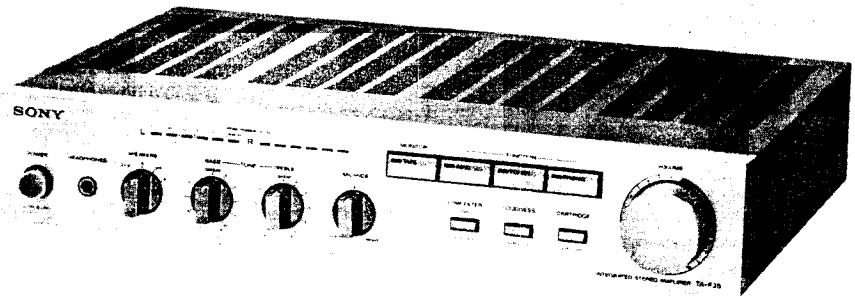
HiFi ENGINE®

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please visit www.hifiengine.com

# TA-F35

*US Model*
*Canadian Model*
*AEP Model*
*UK Model*




# INTEGRATED STEREO AMPLIFIER

## SPECIFICATIONS

### POWER AMPLIFIER SECTION

**Power Output and Total Harmonic Distortion:** (US, Canadian model)
With 8Ω loads, both channels driven, from 20 – 20,000 Hz; rated 40 watts per channel minimum RMS power, with no more than 0.015% total harmonic distortion from 250 mW to rated output.

Continuous RMS power output:
(Less than 0.015% THD, both channels driven simultaneously) At 20 Hz - 20 kHz
40 + 40 watts (8 ohms)
(AEP, UK model) According to DIN 45500
40 + 40 watts (8 ohms)
Power bandwidth (IHF): 20 Hz - 20 kHz
Dynamic headroom: 1.8 dB*
Harmonic distortion: Less than 0.015% at rated output
Less than 0.01% at 20 W output
Intermodulation (IM) distortion:
(60 Hz : 7 kHz = 4 : 1) Less than 0.015% at rated output
Less than 0.01% at 20 W output
Frequency response: PHONO RIAA equalization curve ±0.2 dB
TUNER
AUX 5 Hz - 60 kHz $^{+0}_{-1}$ dB
TAPE
Residual noise: Less than 180 μV (8 ohms, network A)
Damping factor: 50 (8 ohms, 1 kHz)

– Continued on page 2 –

SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY SHADING AND MARK ⚠ ON THE SCHEMATIC DIAGRAMS, EXPLODED VIEWS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

ATTENTION AU COMPOSANT AYANT RAPPORT À LA SÉCURITÉ!

LES COMPOSANTS IDENTIFIÉS PAR UNE TRAME ET UNE MARQUE ⚠ SUR LES DIAGRAMMES SCHÉMATIQUES, LES VUES EXPLOSÉES ET LA LISTE DES PIÈCES SONT CRITIQUES POUR LA SÉCURITÉ DE FONCTIONNEMENT. NE REMPLACER CES COMPOSANTS QUE PAR DES PIÈCES SONY DONT LES NUMÉROS SONT DONNÉS DANS CE MANUEL OU DANS LES SUPPLÉMENTS PUBLIÉS PAR SONY.

SONY®
SERVICE MANUAL

# TA-F35

Inputs :

| | Sensitivity | Impedance | Maximum input capability (1 kHz) | S/N (weighting network, input level) |
|---|---|---|---|---|
| PHONO (MM) | 2.5 mV | 50 kΩ | 150 mV | 88 dB<br>79 dB*<br>(A, 2.5 mV) |
| PHONO (MC) | 0.17 mV | 100 Ω | 11 mV | 73 dB<br>73 dB*<br>(A, 0.25 mV) |
| TUNER AUX TAPE | 150 mV | 50 kΩ | — | 101 dB<br>78 dB*<br>(A, 150 mV) |

* '78 IHF
Measured with rated output power into 8-ohm loads (both channels driven simultaneously) at 1 kHz

Outputs : REC OUT
Voltage 150 mV
Impedance 4.7 kilohms
SPEAKER A, B
Accepts speakers of 8 - 16 ohms.
HEADPHONES
Accepts low and high impedance headphones.

Tone controls : BASS
±10 dB at 100 Hz (turnover frequency 500 Hz)
TREBLE
±10 dB at 25 kHz (turnover frequency 5 kHz)

Loudness (att. 30 dB) + 10 dB at 100 Hz, + 3 dB at 10 kHz

Low filter : 6 dB/octave attenuation below 15 Hz

**General**

**System:** Preamplifier section : low-noise NF type equalizer amp.; NF type tone control
Power amplifier section : pure-complementary SEPP dc power amplifier with all stages direct coupled

**Power Requirements:** US, Canadian model: 120V ac, 60 Hz
UK model: 240V ac (or 220V ac adjustable by authorized Sony personnel), 50 Hz
AEP model: 220V ac (or 240V ac adjustable by authorized Sony personnel), 50 Hz

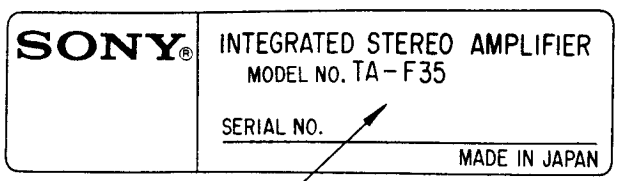
**Power Consumption:** UK model: 250W
AEP model: 240W
US model: 90W
Canadian model: 140W

**Dimensions:** Approx. 430 × 80 × 335 mm (w/h/d) (17 × 3¼ × 13¼ inches) including projecting parts and controls

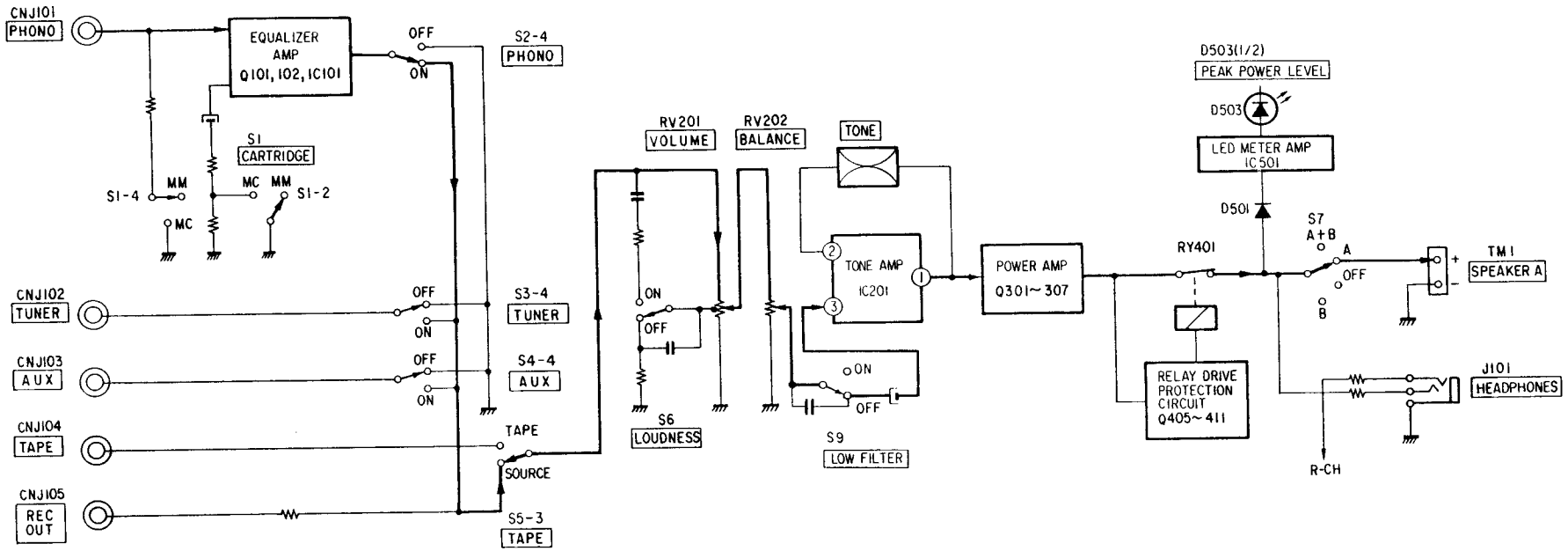
Weight : Approx. 6.2 kg (13 lbs 11 oz) net
Approx. 7.2 kg (15 lbs 14 oz) in shipping carton

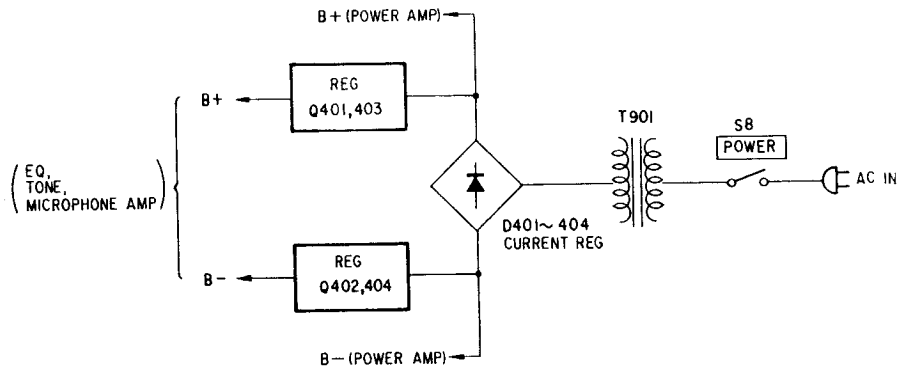
## MODEL IDENTIFICATION

### Specification Label




| | | | | |
|---|---|---|---|---|
| US model | : | AC 120V | 60Hz | 90W |
| Canadian model | : | AC 120V | 60Hz | 140W |
| AEP model | : | AC 220V | ~50/60Hz | 240W |
| UK model | : | AC 240V | ~50/60Hz | 250W |



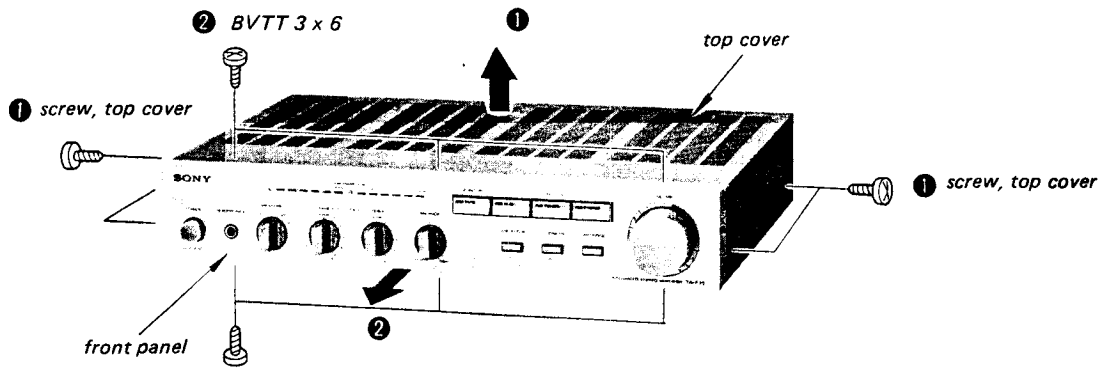

R-CH: SAME AS L-CH

# SECTION 2
# DISASSEMBLY

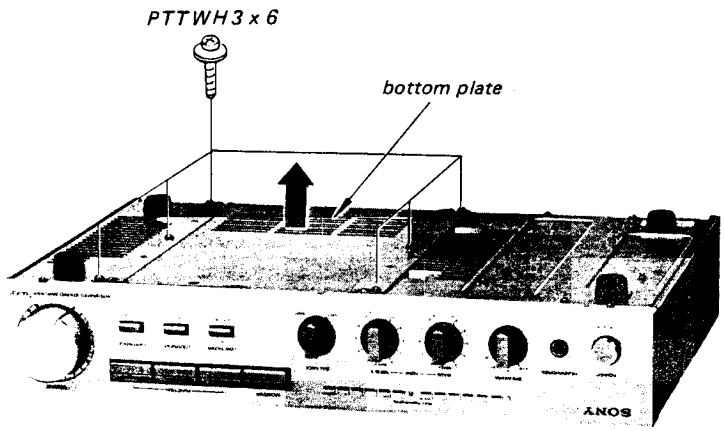
- Follow the disassembly procedure in the numerical order given.

## TOP COVER/ FRONT PANEL REMOVAL

❶ : *top cover*
❶, ❷ : *front panel*




## BOTTOM PLATE REMOVAL



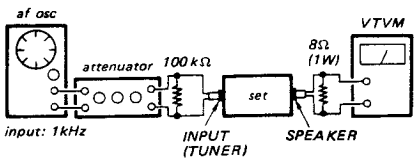
# SECTION 3
# ADJUSTMENTS

**NOTE:**

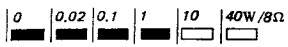
1. DC BIAS and DC BALANCE adjustments should be made about several minutes later after the POWER switch is turned on.
2. Make the DC BIAS adjustment first.
3. Repeat DC BIAS and DC BALANCE adjustments two or three times.
4. After replacing the power transistors, DC BIAS and DC BALANCE adjustments should be performed.

**Indicator Sensitivity Adjustment**

**Procedure:**



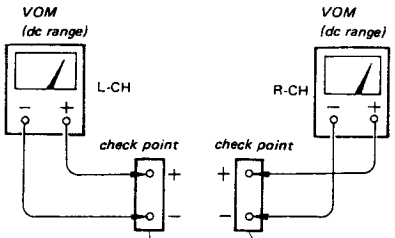

1. Turn the VOLUME control fully clockwise.
2. Adjust the input level of the set for 1W (2.5V) reading on the VTVM.
3. Adjust RT501 (L-CH) and RT551 (R-CH) so that the PEAK POWER LEVEL indicators of 1W and less light up.

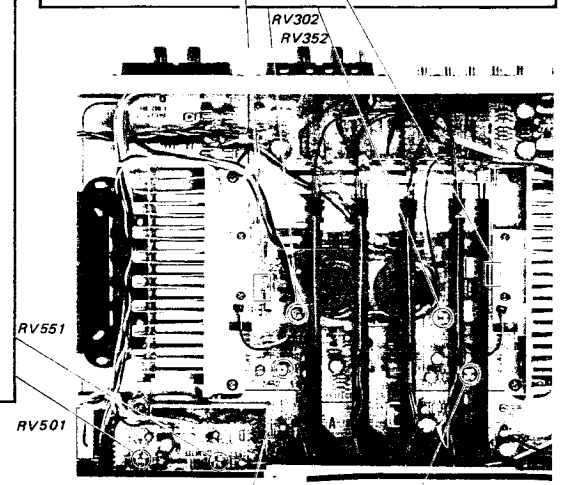



**DC Bias Adjustment**

**Procedure:** Adjust RV302 (L-CH) and RV352 (R-CH) for 15mV readings with no signal input.

**Adjustment Location:**

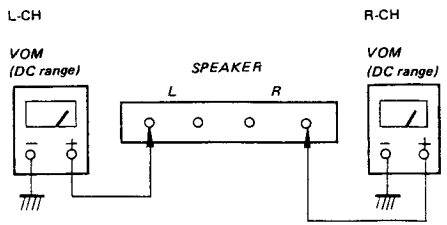



**DC Balance Adjustment**

**Procedure:**
Adjust RV301 (L-CH) and RV351 (R-CH) for 0V readings with no signal input.

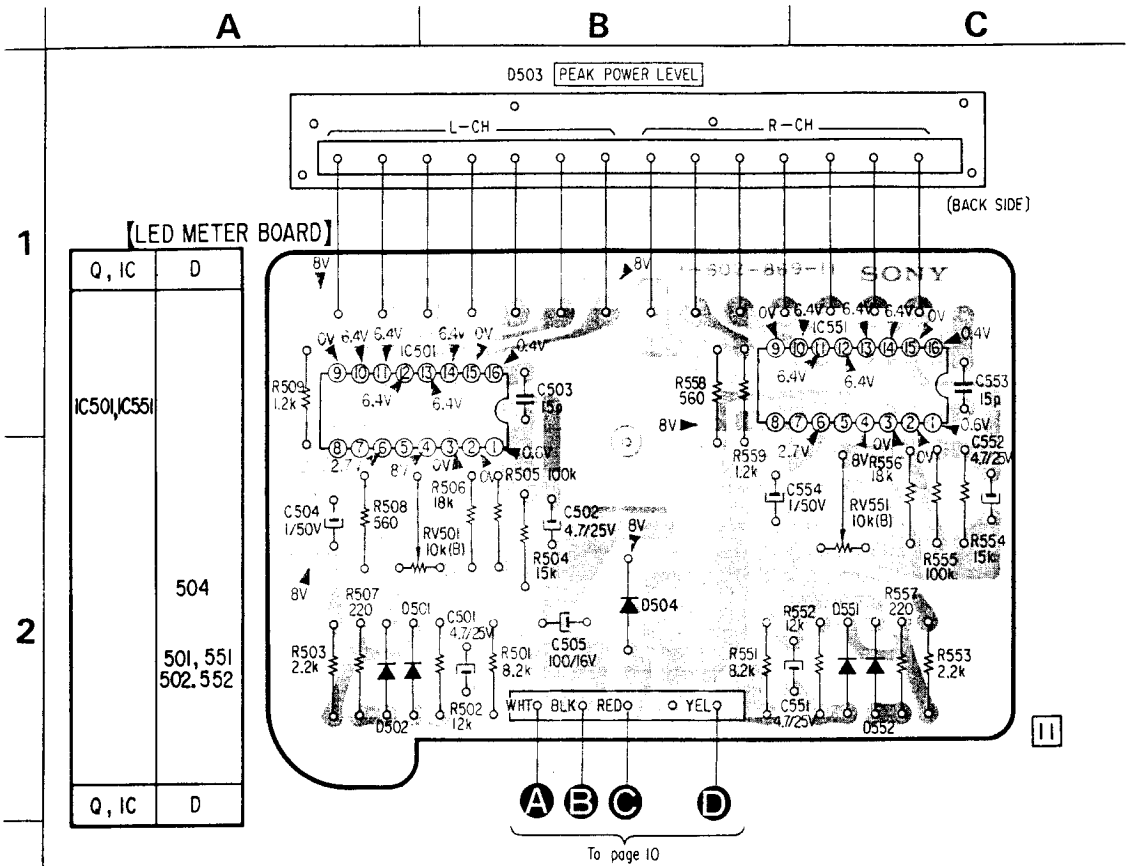
**Adjustment Location:**



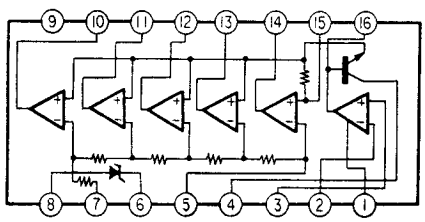
# SECTION 4
# DIAGRAMS

## 4-1. MOUNTING DIAGRAM

*– Conductor Side –*

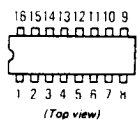



IC501,551

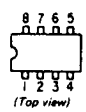


### Semiconductor Lead Layouts

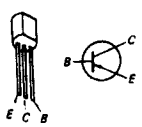
**LB1405**



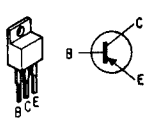

**NJM4559D**



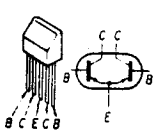

**2SA733 2SB647 2SB647A**



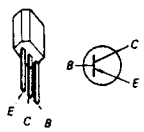
**2SA771**



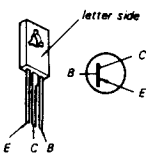
**2SA798**



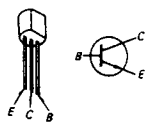
**2SA1027 2SA1027R**



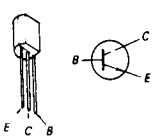
**2SB731**



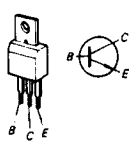

**2SC900 2SC666A 2SC1362 2SD667 2SC1364 2SD667A 2SD666**



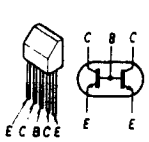
**2SC945 2SC1400 2SC2240**



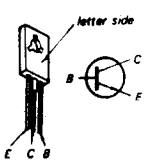
**2SC1986**



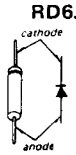
**2SC2291**



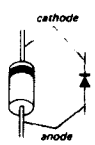
**2SD809**



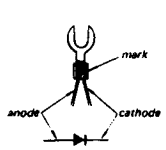

**1T22AM 10E2 1S188AN IN4002 1S1555 RD6.2E 1SS53 RD6.2EB**



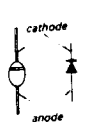

**30D2**

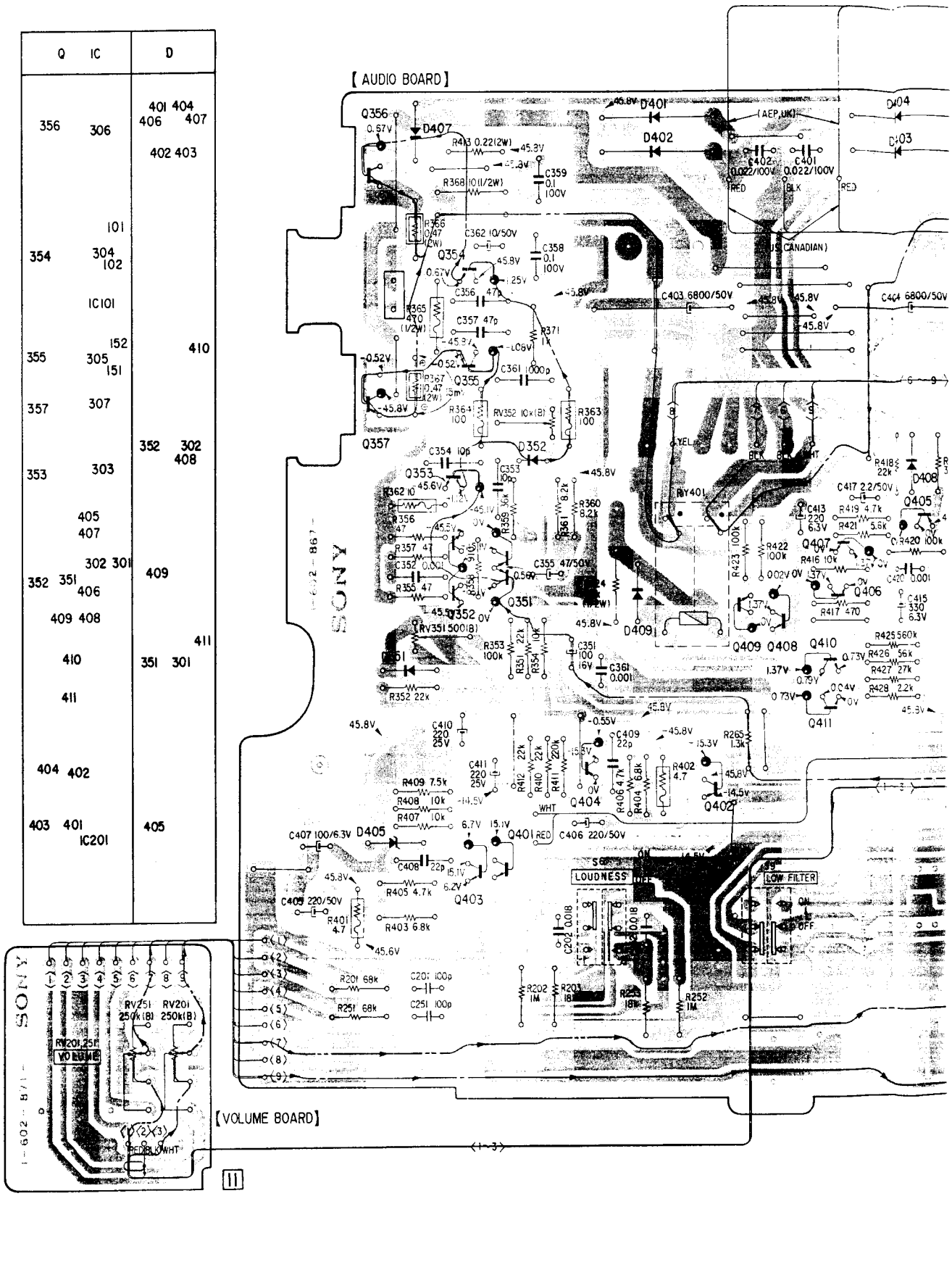



**SV04S**



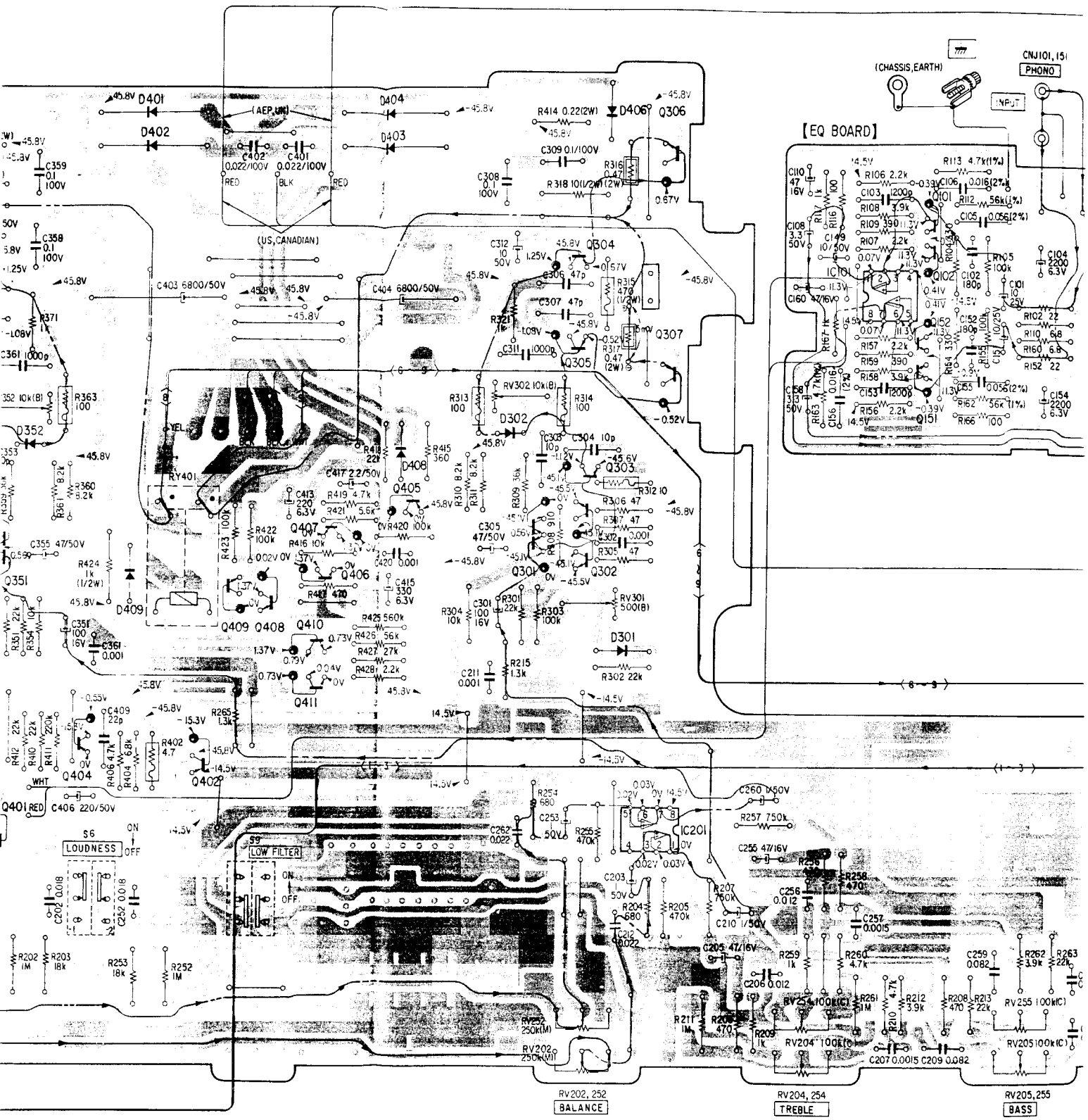

**U05G**






• ○— : parts extracted from the component side.
• ▒▒ : B + pattern
• ——→ : signal path
• —·→ : L-CH signal path
• —··→ : R-CH signal path

C D E F



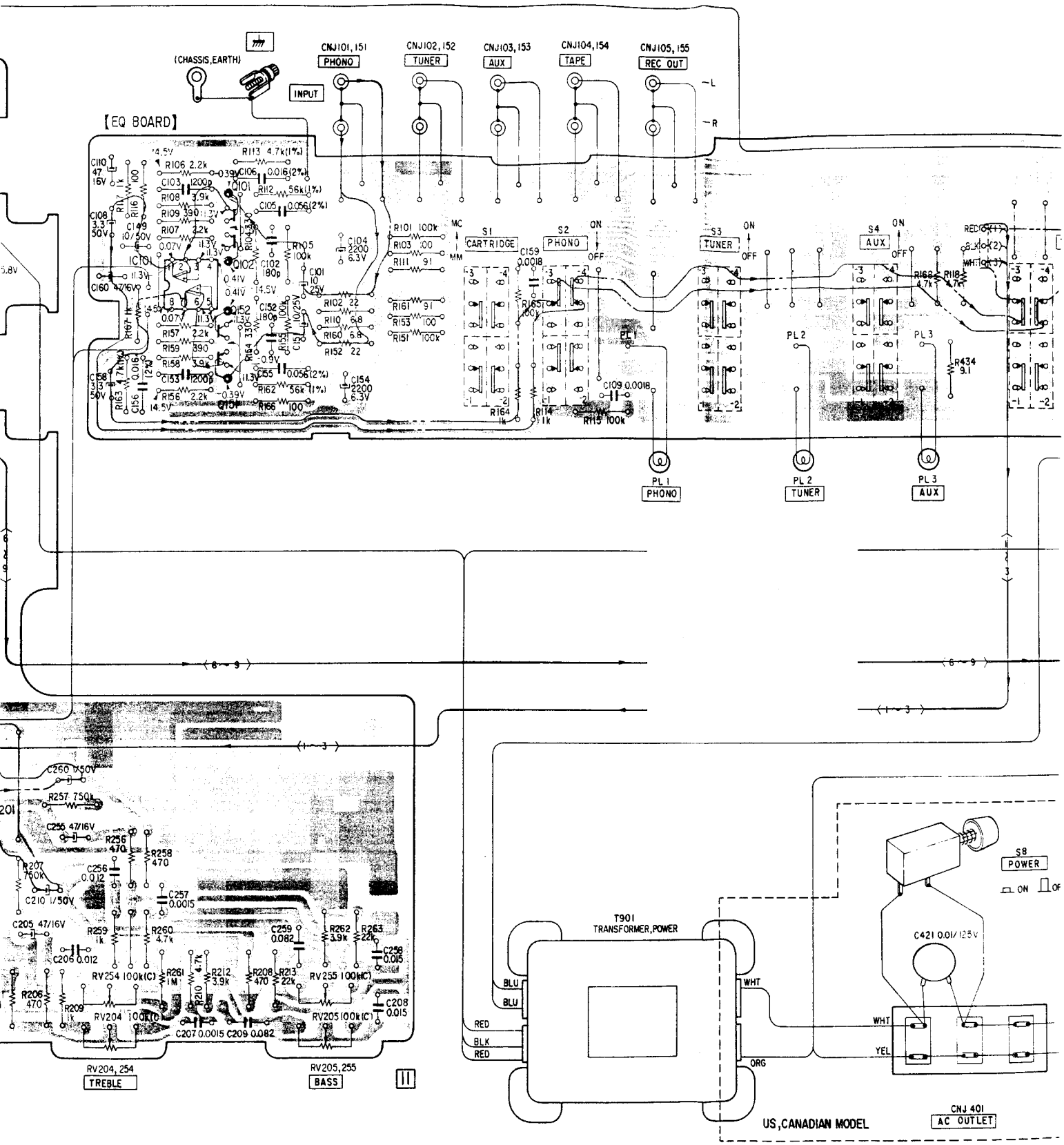

: signal path

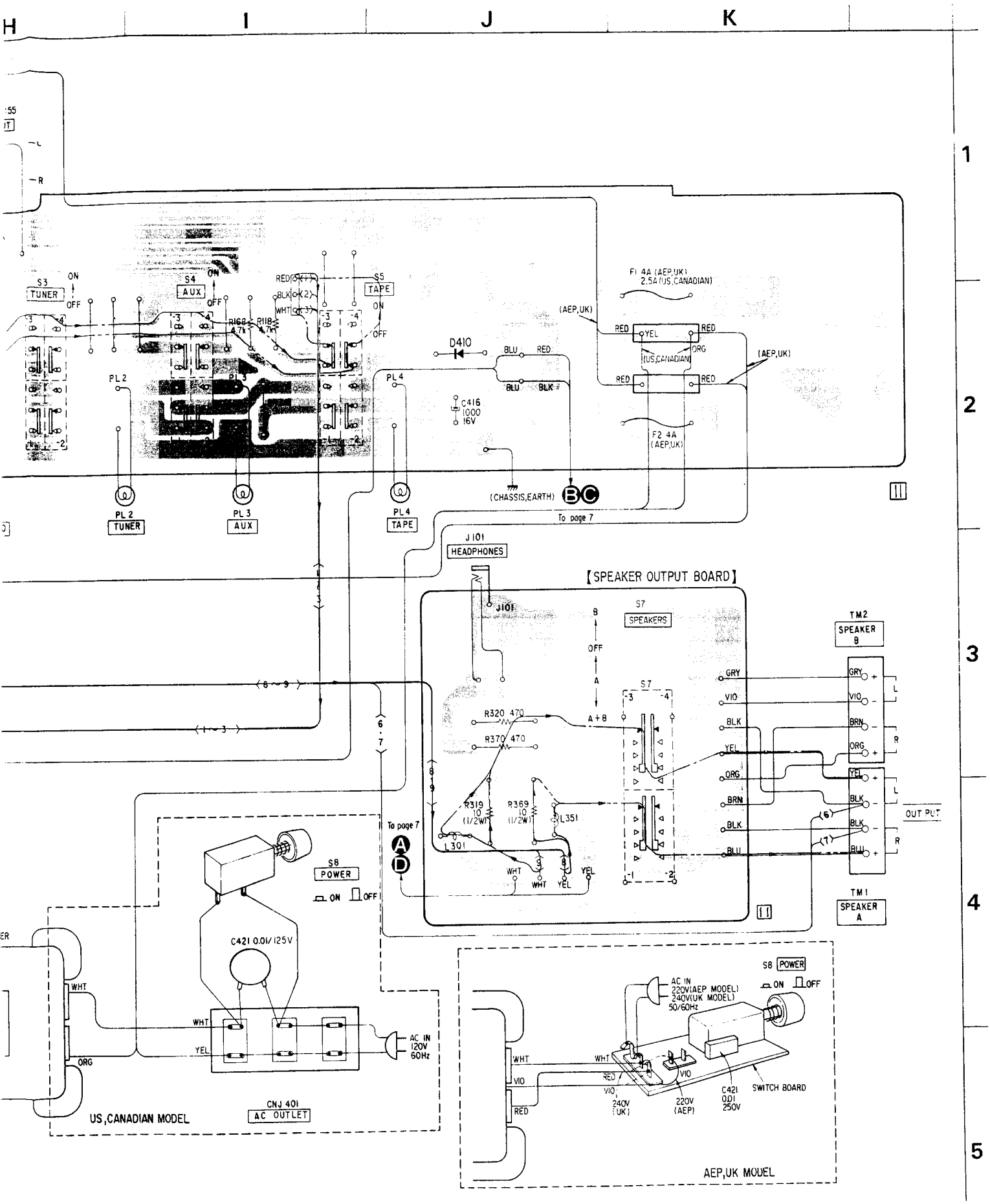
: L-CH signal path

: R-CH signal path

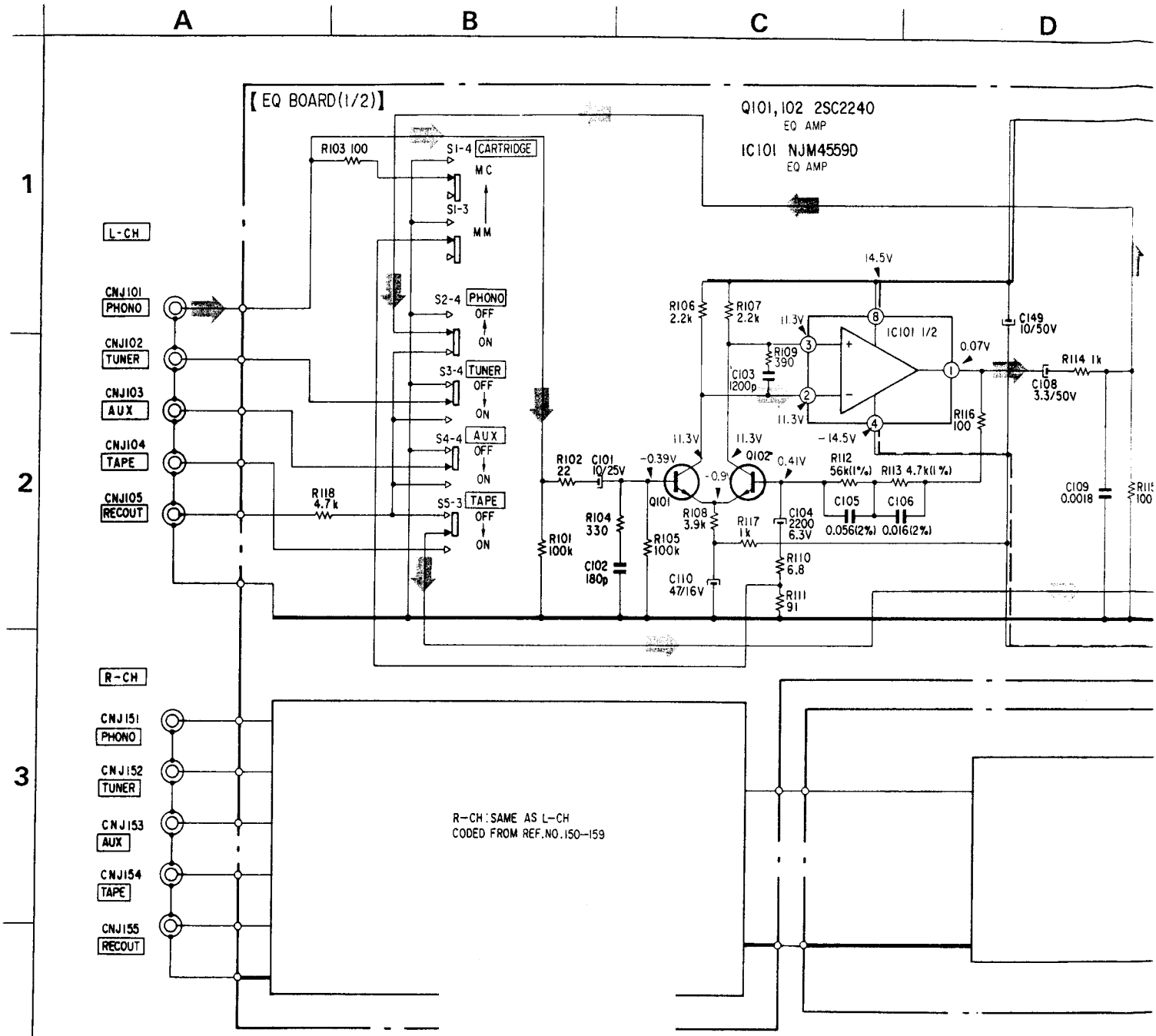
1

F G H I


(CHASSIS,EARTH)
INPUT
CNJ101, 151
PHONO
CNJ102, 152
TUNER
CNJ103, 153
AUX
CNJ104, 154
TAPE
CNJ105, 155
REC OUT
L
R
【EQ BOARD】
S1
CARTRIDGE
S2
PHONO
S3
TUNER
S4
AUX
ON
OFF
PL1
PHONO
PL2
TUNER
PL3
AUX
S8
POWER
T901
TRANSFORMER, POWER
US, CANADIAN MODEL
CNJ 401
AC OUTLET
RV204, 254
TREBLE
RV205, 255
BASS


H
I
J
K
1
2
3
4
5
S3 TUNER
S4 AUX
S5 TAPE
ON
OFF
R168 4.7k
R118 4.7k
RED
BLK
WHT
D410
BLU
RED
BLU
BLK
C416 1000 16V
F1 4A (AEP,UK) 2.5A (US,CANADIAN)
(AEP,UK)
RED
YEL
ORG
(US,CANADIAN)
F2 4A (AEP,UK)
PL2
PL3
PL4
PL 2 TUNER
PL 3 AUX
PL 4 TAPE
(CHASSIS,EARTH)
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J101 HEADPHONES
【SPEAKER OUTPUT BOARD】
S7 SPEAKERS
B
OFF
A
A+B
R320 470
R370 470
R319 10 (1/2W)
R369 10 (1/2W)
L301
L351
WHT
YEL
GRY
VIO
BLK
BRN
ORG
BLU
TM2 SPEAKER B
TM1 SPEAKER A
OUT PUT
L
R
To page 7
S8 POWER
ON
OFF
C421 0.01/125V
WHT
YEL
ORG
AC IN 120V 60Hz
US,CANADIAN MODEL
CNJ 401 AC OUTLET
AC IN 220V(AEP MODEL) 240V(UK MODEL) 50/60Hz
VIO
RED
240V (UK)
220V (AEP)
C421 0.01 250V
SWITCH BOARD
AEP,UK MODEL

## 4-2. SCHEMATIC DIAGRAM

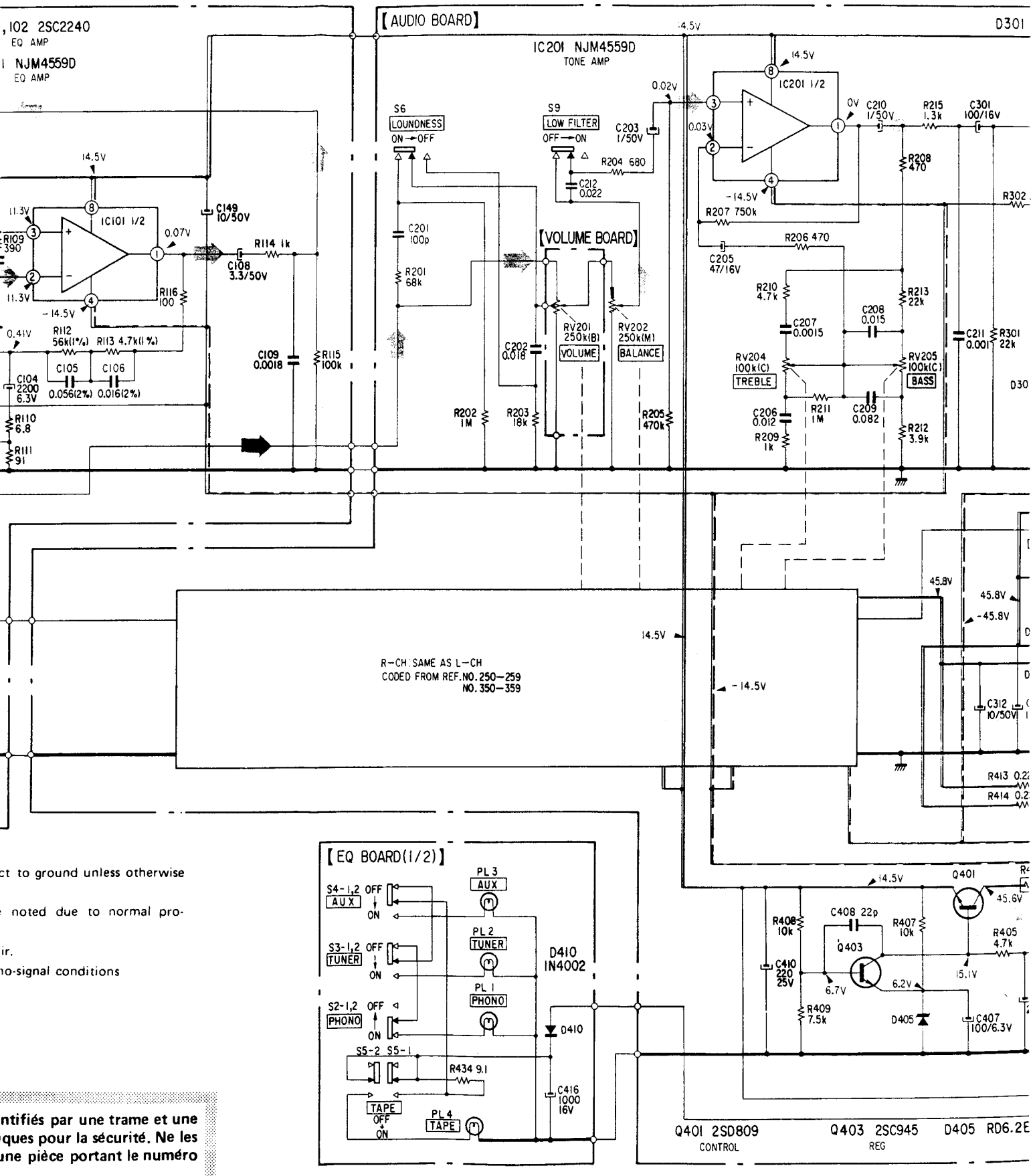



- All capacitors are in μF unless otherwise noted. pF : μμF 50WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in ohms, ¼ W unless otherwise noted. kΩ : 1000 Ω; MΩ : 1000 kΩ
- : nonflammable resistor
- : fusible resistor.
- : panel designation.
- Components for right channel have same values as for left channel.
- : signal path
- Voltages are dc with respect to ground unless otherwise noted.
- Voltage variations may be noted due to normal production tolerances.
- : adjustment for repair.
- Readings are taken under no-signal conditions with a VOM (20 kΩ/V).
- ——: B+ bus.
- — — —: B− bus.

**Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.**

**Note: Les composants identifiés par une trame et une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.**

D E F G




ct to ground unless otherwise

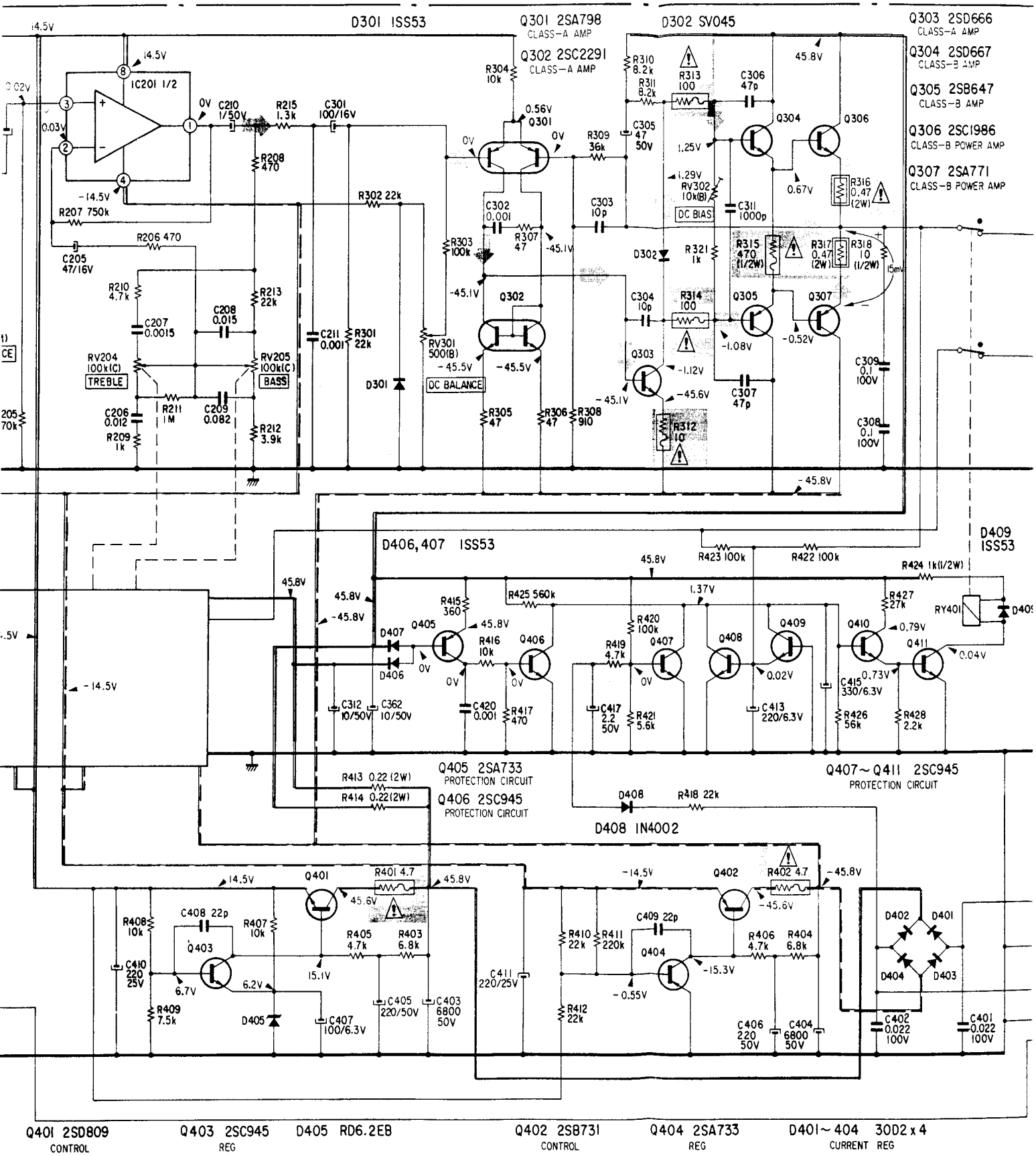
noted due to normal pro-

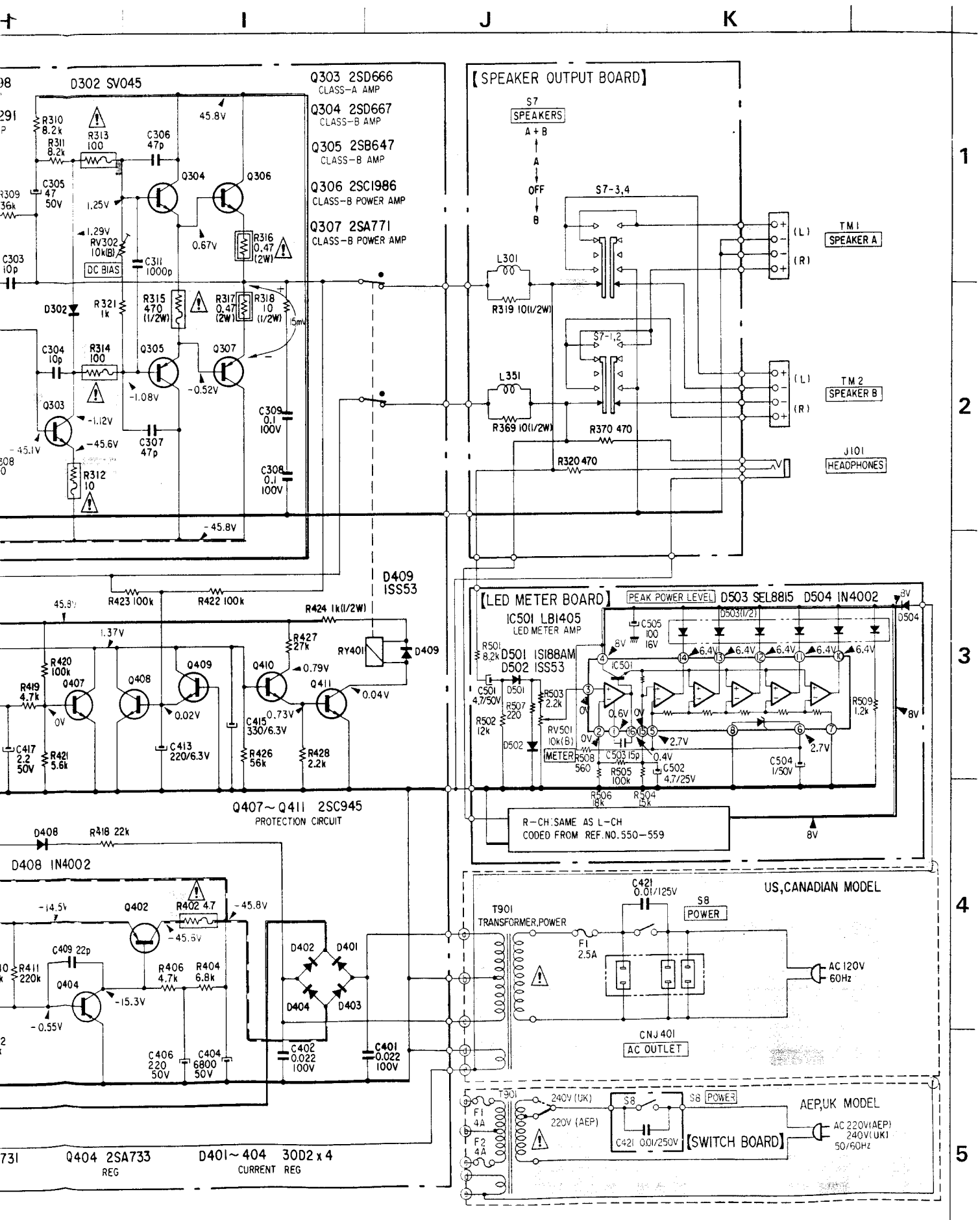
ir.

no-signal conditions

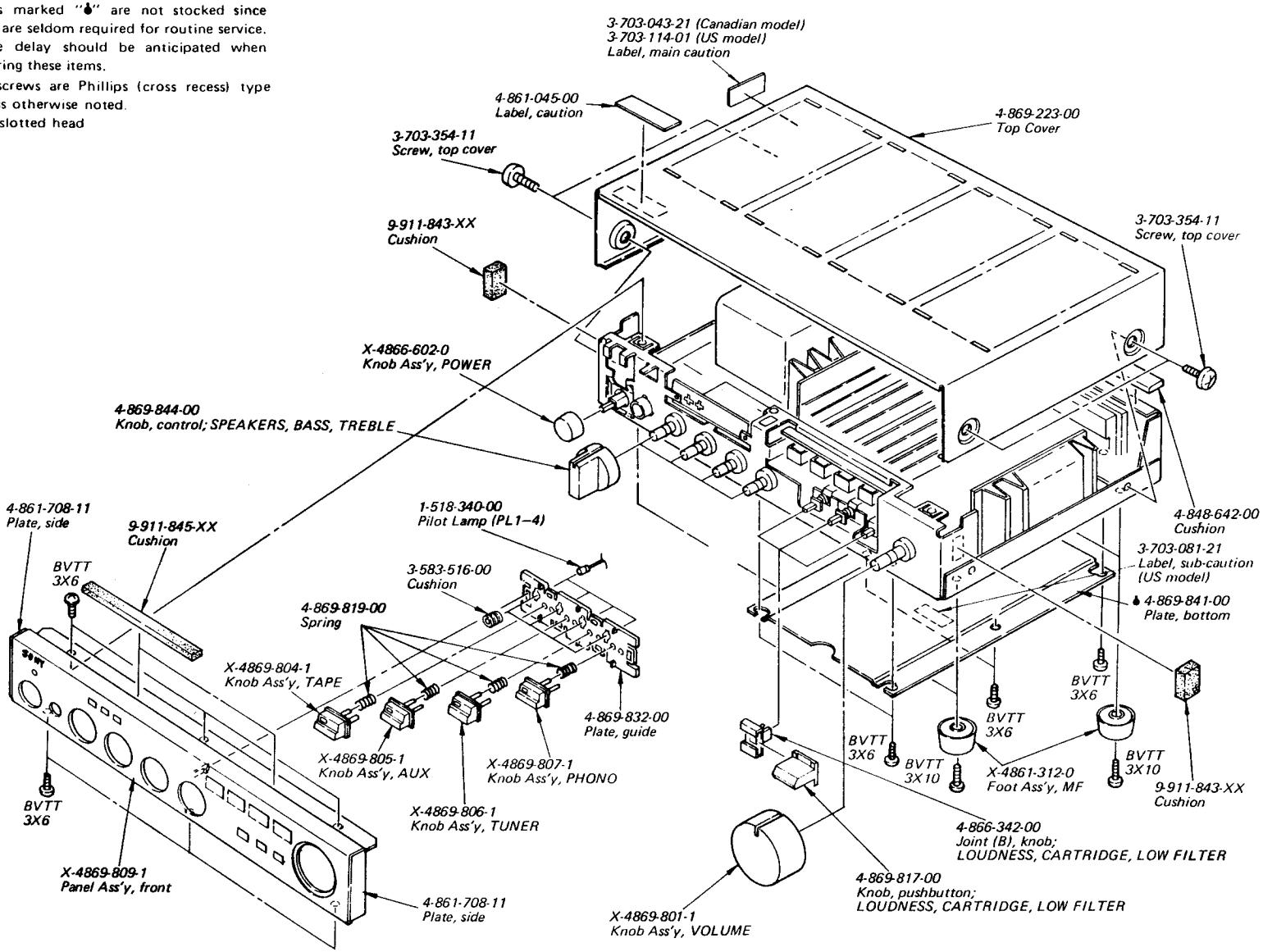
ntifiés par une trame et une
ques pour la sécurité. Ne les
une pièce portant le numéro

F G H I


D301 ISS53
Q301 2SA798
CLASS-A AMP
Q302 2SC2291
CLASS-A AMP
D302 SV045
Q303 2SD666
CLASS-A AMP
Q304 2SD667
CLASS-B AMP
Q305 2SB647
CLASS-B AMP
Q306 2SC1986
CLASS-B POWER AMP
Q307 2SA771
CLASS-B POWER AMP
IC201 1/2
TREBLE
BASS
DC BIAS
DC BALANCE
D406,407 ISS53
D409 ISS53
Q405 2SA733
PROTECTION CIRCUIT
Q406 2SC945
PROTECTION CIRCUIT
Q407~Q411 2SC945
PROTECTION CIRCUIT
D408 IN4002
Q401 2SD809
CONTROL
Q403 2SC945
REG
D405 RD6.2EB
Q402 2SB731
CONTROL
Q404 2SA733
REG
D401~404 30D2 x 4
CURRENT REG

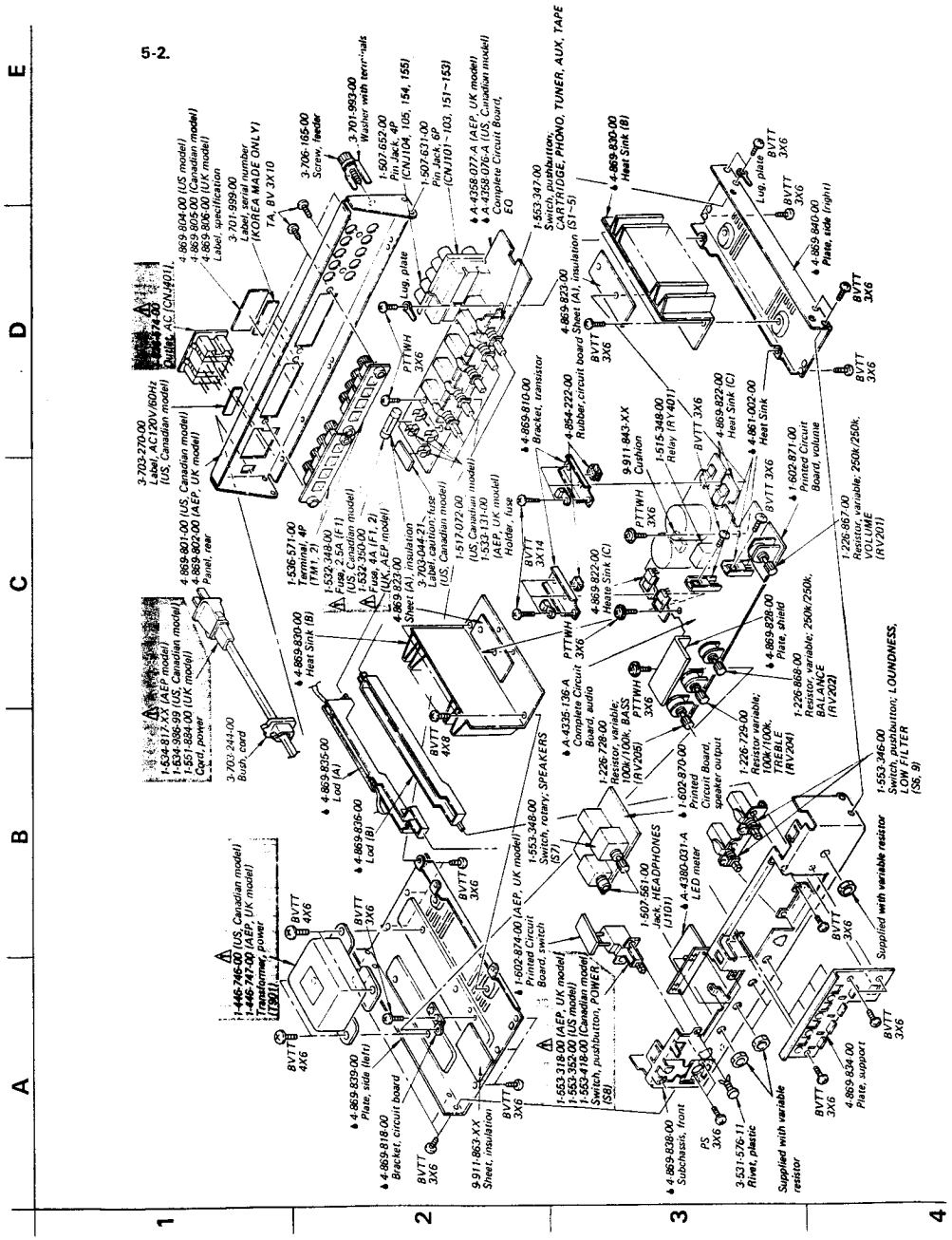

I
J
K
1
2
3
4
5
D302 SV045
Q303 2SD666
CLASS-A AMP
Q304 2SD667
CLASS-B AMP
Q305 2SB647
CLASS-B AMP
Q306 2SC1986
CLASS-B POWER AMP
Q307 2SA771
CLASS-B POWER AMP
DC BIAS
[SPEAKER OUTPUT BOARD]
S7
SPEAKERS
A+B
A
OFF
B
S7-3,4
S7-1,2
L301
L351
R319 10(1/2W)
R369 10(1/2W)
R370 470
R320 470
TM1
SPEAKER A
TM2
SPEAKER B
J101
HEADPHONES
(L)
(R)
D409
ISS53
[LED METER BOARD]
PEAK POWER LEVEL
D503 SEL8815
D504 IN4002
IC501 LB1405
LED METER AMP
D501 ISI88AM
D502 ISS53
METER
R-CH:SAME AS L-CH
CODED FROM REF.NO.550-559
Q407~Q411 2SC945
PROTECTION CIRCUIT
D408 IN4002
Q402 2SA733
REG
D401~404 30D2x4
CURRENT REG
US,CANADIAN MODEL
T901
TRANSFORMER,POWER
S8
POWER
F1
2.5A
AC 120V
60Hz
CNJ401
AC OUTLET
AEP,UK MODEL
240V (UK)
220V (AEP)
F1 4A
F2 4A
C421 0.01/250V
[SWITCH BOARD]
AC 220V(AEP)
240V(UK)
50/60Hz

Note:
- Items marked "♦" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- All screws are Phillips (cross recess) type unless otherwise noted.
(-) = slotted head




Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

**Note: Les composants identifiés par une trame et une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.**






# SECTION 6
# ELECTRICAL PARTS LIST

| Ref. No. | Part No. | Description |
|---|---|---|
| | | **SEMICONDUCTORS** |
| | | **Transistors** |
| Q101, 102<br>Q151, 152 | 8-729-140-02 | 2SC1400 |
| Q301, 351 | 8-729-679-82 | 2SA798 |
| Q302, 352 | 8-729-629-12 | 2SC2291 |
| Q303, 353 | 8-729-300-62 | 2SD666A |
| Q304, 354 | 8-729-306-72 | 2SD667A |
| Q305, 355 | 8-729-300-72 | 2SB647A |
| Q306, 356 | 8-729-398-62 | 2SC1986 |
| Q307, 357 | 8-729-377-12 | 2SA771 |
| Q401 | 8-729-180-93 | 2SD809 |
| Q402 | 8-729-173-13 | 2SB731 |
| Q403 | 8-729-663-47 | 2SC1364 |
| Q404, 405 | 8-729-612-77 | 2SA1027R |
| Q406-411 | 8-729-663-47 | 2SC1364 |
| | | **ICs** |
| IC101, 201 | 8-759-745-59 | NJM4559D |
| IC501, 551 | 8-759-814-05 | LB1405 |
| | | **Diodes** |
| D301, 351 | 8-719-815-55 | 1S1555 |
| D302, 352 | 8-719-300-11 | SV04S |
| D401-404 | 8-719-911-55 | U05G |
| D405 | 8-719-162-07 | RD6.2E |
| D406, 407 | 8-719-815-55 | 1S1555 |
| D408 | 8-719-200-02 | 10E2 |
| D409 | 8-719-815-55 | 1S1555 |
| D410 | 8-719-200-02 | 10E2 |
| D501 | 8-719-422-21 | 1T22AM |
| D502 | 8-719-815-55 | 1S1555 |
| D504 | 8-719-200-02 | 10E2 |

Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

Note: Les composants identifiés par une trame et une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

| Ref. No. | Part No. | Description |
|---|---|---|
| | | **CAPACITORS** |

• All capacitors are in μF. Common capacitors are omitted. Refer to the lists on pages 18 and 19 for their part numbers.

| | | | |
|---|---|---|---|
| C302, 311<br>C352, 361 | 1-161-323-00 | 0.001 50V | ceramic |
| C403, 404 | 1-125-229-00 | 6800 50V | electrolytic |
| C421 | ⚠1-130-455-00 | 0.01 250V | film (AEP, UK model) |
| C421 | ⚠1-161-744-00 | 0.01 400V | ceramic (AEP, UK model) |
| C421 | ⚠1-161-749-00 | 0.001 125V | ceramic (US, Canadian model) |
| | | **RESISTORS** | |

All resistors are in ohms. Common ¼W carbon resistors are omitted. Refer to the list on page 20 for their part numbers.

| | | | | |
|---|---|---|---|---|
| R312, 362 | ⚠1-212-857-00 | 10 | | fusible |
| R313, 314<br>R363, 364 | ⚠1-212-881-51 | 100 | | fusible |
| R315, 365 | ⚠1-212-998-00 | 470 | ½W | fusible |
| R316, 317<br>R366, 367 | 1-217-153-00 | 0.47 | 2W | metal plate (nonflammable) |
| R318, 368 | 1-244-825-00 | 10 | ½W | carbon |
| R319, 369 | 1-244-825-00 | 10 | ½W | carbon |
| R320, 370 | 1-244-865-00 | 470 | ½W | carbon |
| R401, 402 | ⚠1-212-849-00 | 4.7 | | metal-oxide (nonflammable) |
| R413, 414 | 1-217-151-00 | 0.22 | 2W | metal plate |
| R415 | ⚠1-212-894-00 | 360 | | fusible |
| R424 | 1-244-873-00 | 1k | ½W | carbon |
| RV201 | 1-226-867-00 | 250k/250k, variable; VOLUME | | |
| RV202 | 1-226-868-00 | 250k/250k, variable; BALANCE | | |
| RV204 | 1-226-729-00 | 100k/100k, variable; TREBLE | | |
| RV205 | 1-226-728-00 | 100k/100k, variable; BASS | | |
| RV301, 351 | 1-226-232-00 | 500, adjustable; DC BALANCE | | |
| RV302, 352 | 1-226-236-00 | 10k, adjustable; DC BIAS | | |
| RV501, 551 | 1-226-236-00 | 10k, adjustable; LED METER | | |

• Items marked "◆" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

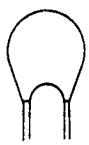
| Ref. No. | Part No. | Description |
|---|---|---|
| | | **MISCELLANEOUS** |
| CNJ101-103, CNJ151-153 | 1-507-631-00 | Pin Jack, 6p |
| CNJ104, 105, CNJ154, 155 | 1-507-652-00 | Pin Jack, 4p |
| CNJ401 | ⚠1-526-574-00 | Outlet, AC |
| F1 | ⚠1-532-348-00 | Fuse, 2.5A (US, Canadian model) |
| F1, 2 | ⚠1-532-350-00 | Fuse, 4A (UK, AEP model) |
| J101 | 1-507-561-00 | Jack, HEADPHONES |
| ♦L301, 351 | 1-420-838-00 | Coil |
| RY401 | 1-515-348-00 | Relay |
| PL1-4 | 1-518-340-00 | Pilot Lamp |
| S1-5 | 1-553-347-00 | Switch, pushbutton; CARTRIDGE, PHONO, TUNER, AUX, TAPE |
| S6 | 1-553-346-00 | Switch, pushbutton; LOUDNESS |
| S7 | 1-553-348-00 | Switch, rotary; SPEAKERS |
| S8 | ⚠1-553-318-00 | Switch, pushbutton; POWER (AEP, UK model) |
| | ⚠1-553-352-00 | Switch, pushbutton; POWER (US model) |
| | ⚠1-553-418-00 | Switch, pushbutton; POWER (Canadian model) |
| S9 | 1-553-346-00 | Switch, pushbutton; LOW FILTER |
| T901 | ⚠1-446-746-00 | Transformer, power (US, Canadian model) |
| | ⚠1-446-747-00 | Transformer, power (AEP, UK model) |
| TM1, 2 | 1-536-571-00 | Terminal, 4p |
| | 1-517-072-00 | Holder, fuse (US, Canadian model) |
| | 1-533-131-00 | Holder, fuse (AEP, UK model) |
| | ⚠1-534-817-XX | Cord, power (AEP model) |
| | ⚠1-534-986-99 | Cord, power (US, Canadian model) |
| | ⚠1-551-884-00 | Cord, power (UK model) |
| | | **COMPLETE CIRCUIT BOARDS** |
| | ♦A-4335-136-A | Audio |
| | ♦A-4358-077-A | EQ (AEP, UK model) |
| | ♦A-4358-076-A | EQ (US, Canadian model) |
| | ♦A-4380-031-A | LED meter |
| | | **PRINTED CIRCUIT BOARDS** |
| | ♦1-602-870-00 | Speaker Out |
| | ♦1-602-871-00 | Volume |
| | ♦1-602-874-00 | Switch (AEP, UK model) |

**ACCESSORIES AND PACKING MATERIALS**

| Part No. | Description |
|---|---|
| 3-701-630-00 | Bag, polyethylene |
| 3-783-201-11 | Manual, instruction (AEP, UK model) |
| 3-783-201-21 | Manual, instruction (US model) |
| 3-783-201-21, 3-794-845-31 | Manual, instruction (Canadian model) |
| 4-863-543-00 | Cushion |
| 4-866-723-00 | Sheet, polyethylene |
| 4-869-846-00 | Carton, individual |

## MYLAR CAPACITORS

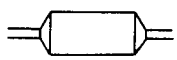
| CAP. (μF) | RATING 50 VOLT. PART No. | 100 VOLT. PART No. | 200 VOLT. PART No. | CAP. (μF) | 50 VOLT. PART No. | 100 VOLT. PART No. | 200 VOLT. PART No. | CAP. (μF) | 50 VOLT. PART No. | 100 VOLT. PART No. | 200 VOLT. PART No. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.001 | 1-108-227-00 | 1-108-365-00 | 1-108-409-00 | 0.01 | 1-108-239-00 | 1-108-377-00 | 1-108-421-00 | 0.1 | 1-108-251-00 | 1-108-389-00 | 1-108-433-00 |
| 0.0012 | 1-108-351-00 | 1-108-366-00 | 1-108-410-00 | 0.012 | 1-108-357-00 | 1-108-378-00 | 1-108-422-00 | 0.12 | 1-108-363-00 | 1-108-390-00 | 1-108-434-00 |
| 0.0015 | 1-108-228-00 | 1-108-367-00 | 1-108-411-00 | 0.015 | 1-108-240-00 | 1-108-379-00 | 1-108-423-00 | 0.15 | 1-108-252-00 | 1-108-391-00 | 1-108-435-00 |
| 0.0018 | 1-108-352-00 | 1-108-368-00 | 1-108-412-00 | 0.018 | 1-108-358-00 | 1-108-380-00 | 1-108-424-00 | 0.18 | 1-108-364-00 | 1-108-392-00 | 1-108-436-00 |
| 0.0022 | 1-108-220-00 | 1-108-369-00 | 1-108-413-00 | 0.022 | 1-108-242-00 | 1-108-381-00 | 1-108-425-00 | 0.22 | 1-108-254-00 | 1-108-393-00 | 1-108-437-00 |
| 0.0027 | 1-108-353-00 | 1-108-370-00 | 1-108-414-00 | 0.027 | 1-108-359-00 | 1-108-382-00 | 1-108-426-00 | 0.27 | 1-108-854-00 | – | – |
| 0.0033 | 1-108-232-00 | 1-108-371-00 | 1-108-415-00 | 0.033 | 1-108-244-00 | 1-108-383-00 | 1-108-427-00 | 0.33 | 1-108-855-00 | – | – |
| 0.0039 | 1-108-354-00 | 1-108-372-00 | 1-108-416-00 | 0.039 | 1-108-360-00 | 1-108-384-00 | 1-108-428-00 | 0.39 | 1-108-856-00 | – | – |
| 0.0047 | 1-108-234-00 | 1-108-373-00 | 1-108-417-00 | 0.047 | 1-108-246-00 | 1-108-385-00 | 1-108-429-00 | 0.47 | 1-108-857-00 | – | – |
| 0.0056 | 1-108-355-00 | 1-108-374-00 | 1-108-418-00 | 0.056 | 1-108-361-00 | 1-108-386-00 | 1-108-430-00 | | | | |
| 0.0068 | 1-108-237-00 | 1-108-375-00 | 1-108-419-00 | 0.068 | 1-108-249-00 | 1-108-387-00 | 1-108-431-00 | | | | |
| 0.0082 | 1-108-356-00 | 1-108-376-00 | 1-108-420-00 | 0.082 | 1-108-362-00 | 1-108-388-00 | 1-108-432-00 | | | | |



## TANTALUM CAPACITORS

| CAP. (μF) | RATING → : Use the high voltage rated one. 3.15 VOLT. PART No. | 6.3 VOLT. PART No. | 10 VOLT. PART No. | 16 VOLT. PART No. | 20 VOLT. PART No. | 25 VOLT. PART No. | 35 VOLT. PART No. |
|---|---|---|---|---|---|---|---|
| 0.01 | | | | | → | → | 1-131-396-00 |
| 0.015 | | | | | | → | 1-131-397-00 |
| 0.022 | | | | | | → | 1-131-398-00 |
| 0.033 | | | | | | → | 1-131-399-00 |
| 0.047 | | | | | | → | 1-131-400-00 |
| 0.068 | | | | | → | → | 1-131-401-00 |
| 0.1 | | | | | → | → | 1-131-402-00 |
| 0.15 | | | | | → | → | 1-131-403-00 |
| 0.22 | | | | | → | → | 1-131-404-00 |
| 0.33 | | | | | → | 1-131-409-00 | 1-131-405-00 |
| 0.47 | – | – | – | – | 1-131-412-00 | → | 1-131-406-00 |
| 0.68 | – | – | – | 1-131-415-00 | → | 1-131-410-00 | 1-131-407-00 |
| 1.0 | – | – | 1-131-418-00 | – | 1-131-413-00 | → | 1-131-408-00 |
| 1.5 | – | 1-131-421-00 | – | 1-131-416-00 | → | 1-131-411-00 | 1-131-348-00 |
| 2.2 | 1-131-424-00 | – | 1-131-419-00 | – | 1-131-414-00 | 1-131-355-00 | 1-131-349-00 |
| 3.3 | – | 1-131-422-00 | – | 1-131-417-00 | 1-131-362-00 | 1-131-356-00 | 1-131-350-00 |
| 4.7 | 1-131-425-00 | – | 1-131-420-00 | 1-131-369-00 | 1-131-363-00 | 1-131-357-00 | 1-131-351-00 |
| 6.8 | – | 1-131-423-00 | 1-131-376-00 | 1-131-370-00 | 1-131-364-00 | 1-131-358-00 | 1-131-352-00 |
| 10 | 1-131-426-00 | 1-131-383-00 | 1-131-377-00 | 1-131-371-00 | 1-131-365-00 | 1-131-359-00 | 1-131-353-00 |
| 15 | 1-131-390-00 | 1-131-384-00 | 1-131-378-00 | 1-131-372-00 | 1-131-366-00 | 1-131-360-00 | – |
| 22 | 1-131-391-00 | 1-131-385-00 | 1-131-379-00 | 1-131-373-00 | 1-131-367-00 | | |
| 33 | 1-131-392-00 | 1-131-386-00 | 1-131-380-00 | 1-131-374-00 | | | |
| 47 | 1-131-393-00 | 1-131-387-00 | 1-131-381-00 | – | | | |
| 68 | 1-131-394-00 | 1-131-388-00 | – | – | | | |
| 100 | 1-131-395-00 | – | – | – | | | |

## TANTALUM CAPACITORS



| CAP. (μF) | RATING 3 VOLT. PART No. | 6.3 VOLT. PART No. | 10 VOLT. PART No. | 16 VOLT. PART No. | 20 VOLT. PART No. | 35 VOLT. PART No. |
|---|---|---|---|---|---|---|
| 0.033 | | | | | | 1-131-273-00 |
| 0.047 | | | | | | 1-131-274-00 |
| 0.068 | | | | | | 1-131-275-00 |
| 0.1 | | | | | | 1-131-276-00 |
| 0.15 | | | | | | 1-131-277-00 |
| 0.22 | | | – | – | 1-131-262-00 | 1-131-278-00 |
| 0.33 | | | – | – | 1-131-263-00 | 1-131-279-00 |
| 0.47 | | | 1-131-169-00 | – | 1-131-264-00 | 1-131-280-00 |
| 0.68 | | | – | 1-131-258-00 | 1-131-265-00 | 1-131-281-00 |
| 1.0 | | | 1-131-254-00 | – | 1-131-266-00 | 1-131-282-00 |
| 1.5 | | 1-131-250-00 | – | – | 1-131-267-00 | 1-131-283-00 |
| 2.2 | | – | – | 1-131-259-00 | 1-131-268-00 | 1-131-284-00 |
| 3.3 | | – | 1-131-255-00 | – | 1-131-269-00 | – |
| 4.7 | | 1-131-251-00 | 1-131-171-00 | – | 1-131-270-00 | – |
| 6.8 | | – | – | 1-131-260-00 | 1-131-271-00 | – |
| 10 | – | – | 1-131-256-00 | – | 1-131-272-00 | – |
| 15 | – | 1-131-252-00 | – | 1-131-261-00 | | |
| 22 | – | – | 1-131-257-00 | – | | |
| 33 | 1-131-176-00 | 1-131-253-00 | 1-131-173-00 | – | | |
| 47 | 1-131-288-00 | 1-131-174-00 | – | – | | |
| 100 | 1-131-177-00 | | | | | |

## ELECTROLYTIC CAPACITORS

| CAP. (μF) | RATING → : Use the high voltage rated one. | | | | | |
|---|---|---|---|---|---|---|
| | 6.3 VOLT. | 10 VOLT. | 16 VOLT. | 25 VOLT. | 35 VOLT. | 50 VOLT. |
| | PART No. | PART No. | PART No. | PART No. | PART No. | PART No. |
| 0.47 | | | | | → | 1-121-726-00 |
| 1.0 | | | | | → | 1-121-391-00 |
| 2.2 | | | | | → | 1-121-450-00 |
| 3.3 | → | → | → | 1-121-392-00 | → | 1-121-393-00 |
| 4.7 | → | → | → | 1-121-395-00 | → | 1-121-396-00 |
| 10 | → | → | 1-121-651-00 | 1-121-398-00 | → | 1-121-738-00 |
| 22 | → | → | 1-121-479-00 | 1-121-480-00 | 1-121-662-00 | 1-121-152-00 |
| 33 | → | → | 1-121-403-00 | 1-121-404-00 | 1-121-652-00 | 1-121-405-00 |
| 47 | → | 1-121-352-00 | 1-121-409-00 | 1-121-410-00 | 1-121-653-00 | 1-121-411-00 |
| 100 | → | 1-121-414-00 | 1-121-415-00 | 1-121-416-00 | 1-121-357-00 | 1-121-417-00 |
| 220 | 1-121-419-00 | 1-121-420-00 | 1-121-421-00 | 1-121-422-00 | 1-121-261-00 | 1-121-423-00 |
| 330 | 1-121-751-00 | 1-121-805-00 | 1-121-521-00 | 1-121-654-00 | 1-121-655-00 | 1-121-656-00 |
| 470 | 1-121-424-00 | 1-121-425-00 | 1-121-426-00 | 1-121-733-00 | 1-121-361-00 | 1-121-810-00 |
| 1000 | – | 1-121-736-00 | 1-121-245-00 | 1-121-657-00 | 1-121-388-00 | 1-123-061-00 |
| 2200 | 1-121-658-00 | 1-121-659-00 | 1-121-660-00 | 1-123-067-00 | 1-121-984-00 | – |
| 3300 | 1-121-661-00 | 1-123-075-00 | 1-123-071-00 | – | – | – |

| CAP. (μF) | 100 VOLT. | 160 VOLT. | 250 VOLT. | 350 VOLT. |
|---|---|---|---|---|
| | PART No. | PART No. | PART No. | PART No. |
| 0.47 | – | – | – | – |
| 1.0 | 1-123-249-00 | 1-123-252-00 | 1-123-003-00 | 1-121-168-00 |
| 2.2 | 1-123-250-00 | 1-123-026-00 | – | 1-123-028-00 |
| 3.3 | 1-121-995-00 | – | 1-123-004-00 | 1-123-006-00 |
| 4.7 | 1-123-255-00 | 1-121-246-00 | 1-121-759-00 | 1-123-007-00 |
| 10 | 1-121-126-00 | 1-121-999-00 | 1-123-254-00 | 1-123-008-00 |
| 22 | 1-121-996-00 | 1-123-253-00 | 1-123-005-00 | 1-123-022-00 |
| 33 | 1-121-997-00 | 1-121-757-00 | – | – |
| 47 | 1-123-251-00 | 1-121-919-00 | – | – |
| 100 | 1-123-084-00 | – | – | – |

## CERAMIC CAPACITORS

| CAP. (pF) | RATING 50 VOLT. PART No. | CAP. (pF) | 50 VOLT. PART No. | CAP. (pF) | 50 VOLT. PART No. | CAP. (μF) | 50 VOLT. PART No. |
|---|---|---|---|---|---|---|---|
| 0.5 | 1-101-837-00 | 22 | 1-102-959-00 | 150 | 1-101-361-00 | 0.001 | 1-102-074-00 |
| 0.75 | 1-101-586-00 | 24 | 1-102-960-00 | 160 | 1-101-367-00 | 0.0012 | 1-102-118-00 |
| 1.0 | 1-102-934-00 | 27 | 1-102-961-00 | 180 | 1-102-976-00 | 0.0015 | 1-102-119-00 |
| 1.5 | 1-101-576-00 | 30 | 1-102-962-00 | 200 | 1-102-977-00 | 0.0018 | 1-102-120-00 |
| 2.0 | 1-102-935-00 | 33 | 1-102-963-00 | 220 | 1-102-978-00 | 0.0022 | 1-102-121-00 |
| 3 | 1-102-936-00 | 36 | 1-102-964-00 | 240 | 1-102-979-00 | 0.0027 | 1-102-122-00 |
| 4 | 1-102-937-00 | 39 | 1-102-965-00 | 270 | 1-102-980-00 | 0.0033 | 1-102-123-00 |
| 5 | 1-102-942-00 | 43 | 1-102-966-00 | 300 | 1-102-981-00 | 0.0039 | 1-102-124-00 |
| 6 | 1-102-943-00 | 47 | 1-101-880-00 | 330 | 1-102-820-00 | 0.0047 | 1-102-125-00 |
| 7 | 1-102-944-00 | 51 | 1-101-882-00 | 360 | 1-102-821-00 | 0.0056 | 1-102-126-00 |
| 8 | 1-102-945-00 | 56 | 1-101-884-00 | 390 | 1-102-822-00 | 0.0068 | 1-102-127-00 |
| 9 | 1-102-946-00 | 62 | 1-101-886-00 | 430 | 1-102-823-00 | 0.0082 | 1-102-128-00 |
| 10 | 1-102-947-00 | 68 | 1-101-888-00 | 470 | 1-102-824-00 | 0.01 | 1-102-129-00 |
| 11 | 1-102-948-00 | 75 | 1-101-890-00 | 510 | 1-101-059-00 | 0.022 | 1-101-005-00 |
| 12 | 1-102-949-00 | 82 | 1-102-971-00 | 560 | 1-102-115-00 | 0.047 | 1-101-006-00 |
| 13 | 1-102-950-00 | 91 | 1-102-972-00 | 680 | 1-102-116-00 | | |
| 15 | 1-102-951-00 | 100 | 1-102-973-00 | 820 | 1-102-117-00 | | |
| 16 | 1-102-952-00 | 110 | 1-102-815-00 | | | | |
| 18 | 1-102-953-00 | 120 | 1-102-816-00 | | | | |
| 20 | 1-102-958-00 | 130 | 1-101-081-00 | | | | |

0.001μF = 1,000pF

## CERAMIC (SEMICONDUCTOR) CAPACITORS

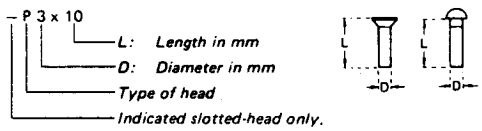
| CAP. (μF) | RATING → : Use the high voltage rated one. 25 VOLT. PART No. | 50 VOLT. PART No. | CAP. (μF) | 25 VOLT. PART No. | 50 VOLT. PART No. |
|---|---|---|---|---|---|
| 0.001 | → | 1-161-039-00 | 0.018 | 1-161-016-00 | 1-161-054-00 |
| 0.0012 | → | 1-161-040-00 | 0.022 | 1-161-017-00 | 1-161-055-00 |
| 0.0015 | | 1-161-041-00 | 0.027 | 1-161-018-00 | 1-161-056-00 |
| 0.0018 | | 1-161-042-00 | 0.033 | 1-161-019-00 | 1-161-057-00 |
| 0.0022 | | 1-161-043-00 | 0.039 | 1-161-010-00 | 1-161-058-00 |
| 0.0027 | → | 1-161-044-00 | 0.047 | 1-161-021-00 | 1-161-059-00 |
| 0.0033 | → | 1-161-045-00 | 0.056 | → | 1-161-060-00 |
| 0.0039 | → | 1-161-046-00 | 0.068 | → | 1-161-061-00 |
| 0.0047 | → | 1-161-047-00 | 0.082 | 1-161-024-00 | 1-161-062-00 |
| 0.0056 | → | 1-161-048-00 | 0.1 | 1-161-025-00 | 1-161-063-00 |
| 0.0068 | → | 1-161-049-00 | | | |
| 0.0082 | 1-161-012-00 | 1-161-050-00 | | | |
| 0.01 | 1-161-013-00 | 1-161-051-00 | | | |
| 0.012 | → | 1-161-052-00 | | | |
| 0.015 | 1-161-015-00 | 1-161-053-00 | | | |

## 1/4 WATT CARBON RESISTORS

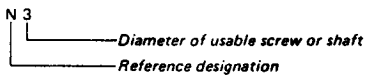
| Ω | Part No. | Ω | Part No. | Ω | Part No. | Ω | Part No. | Ω | Part No. | Ω | Part No. | Ω | Part No. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.0 | 1-246-401-00 | 10 | 1-246-425-00 | 100 | 1-246-449-00 | 1.0k | 1-246-473-00 | 10k | 1-246-497-00 | 100k | 1-246-521-00 | 1.0M | 1-246-545-00 |
| 1.1 | 1-246-402-00 | 11 | 1-246-426-00 | 110 | 1-246-450-00 | 1.1k | 1-246-474-00 | 11k | 1-246-498-00 | 110k | 1-246-522-00 | 1.1M | 1-210-814-00 |
| 1.2 | 1-246-403-00 | 12 | 1-246-427-00 | 120 | 1-246-451-00 | 1.2k | 1-246-475-00 | 12k | 1-246-499-00 | 120k | 1-246-523-00 | 1.2M | 1-210-815-00 |
| 1.3 | 1-246-404-00 | 13 | 1-246-428-00 | 130 | 1-246-452-00 | 1.3k | 1-246-576-00 | 13k | 1-246-500-00 | 130k | 1-246-524-00 | 1.3M | 1-210-816-00 |
| 1.5 | 1-246-405-00 | 15 | 1-246-429-00 | 150 | 1-246-453-00 | 1.5k | 1-246-577-00 | 15k | 1-246-501-00 | 150k | 1-246-525-00 | 1.5M | 1-210-817-00 |
| 1.6 | 1-246-406-00 | 16 | 1-246-430-00 | 160 | 1-246-454-00 | 1.6k | 1-246-578-00 | 16k | 1-246-502-00 | 160k | 1-246-526-00 | 1.6M | 1-210-818-00 |
| 1.8 | 1-246-407-00 | 18 | 1-246-431-00 | 180 | 1-246-455-00 | 1.8k | 1-246-579-00 | 18k | 1-246-503-00 | 180k | 1-246-527-00 | 1.8M | 1-210-819-00 |
| 2.0 | 1-246-408-00 | 20 | 1-246-432-00 | 200 | 1-246-456-00 | 2.0k | 1-246-580-00 | 20k | 1-246-504-00 | 200k | 1-246-528-00 | 2.0M | 1-210-820-00 |
| 2.2 | 1-246-409-00 | 22 | 1-246-433-00 | 220 | 1-246-457-00 | 2.2k | 1-246-581-00 | 22k | 1-246-505-00 | 220k | 1-246-529-00 | 2.2M | 1-210-821-00 |
| 2.4 | 1-246-410-00 | 24 | 1-246-434-00 | 240 | 1-246-458-00 | 2.4k | 1-246-582-00 | 24k | 1-246-506-00 | 240k | 1-246-530-00 | 2.4M | 1-244-754-00 |
| 2.7 | 1-246-411-00 | 27 | 1-246-435-00 | 270 | 1-246-459-00 | 2.7k | 1-246-583-00 | 27k | 1-246-507-00 | 270k | 1-246-531-00 | 2.7M | 1-244-755-00 |
| 3.0 | 1-246-412-00 | 30 | 1-246-436-00 | 300 | 1-246-460-00 | 3.0k | 1-246-584-00 | 30k | 1-246-508-00 | 300k | 1-246-532-00 | 3.0M | 1-244-756-00 |
| 3.3 | 1-246-413-00 | 33 | 1-246-437-00 | 330 | 1-246-461-00 | 3.3k | 1-246-585-00 | 33k | 1-246-509-00 | 330k | 1-246-533-00 | 3.3M | 1-244-757-00 |
| 3.6 | 1-246-414-00 | 36 | 1-246-438-00 | 360 | 1-246-462-00 | 3.6k | 1-246-586-00 | 36k | 1-246-510-00 | 360k | 1-246-534-00 | 3.6M | 1-244-758-00 |
| 3.9 | 1-246-415-00 | 39 | 1-246-439-00 | 390 | 1-246-463-00 | 3.9k | 1-246-587-00 | 39k | 1-246-511-00 | 390k | 1-246-535-00 | 3.9M | 1-244-759-00 |
| 4.3 | 1-246-416-00 | 43 | 1-246-440-00 | 430 | 1-246-464-00 | 4.3k | 1-246-488-00 | 43k | 1-246-512-00 | 430k | 1-246-536-00 | 4.3M | 1-244-760-00 |
| 4.7 | 1-246-417-00 | 47 | 1-246-441-00 | 470 | 1-246-465-00 | 4.7k | 1-246-489-00 | 47k | 1-246-513-00 | 470k | 1-246-537-00 | 4.7M | 1-244-761-00 |
| 5.1 | 1-246-418-00 | 51 | 1-246-442-00 | 510 | 1-246-466-00 | 5.1k | 1-246-490-00 | 51k | 1-246-514-00 | 510k | 1-246-538-00 | 5.1M | 1-244-762-00 |
| 5.6 | 1-246-419-00 | 56 | 1-246-443-00 | 560 | 1-246-467-00 | 5.6k | 1-246-491-00 | 56k | 1-246-515-00 | 560k | 1-246-539-00 | | |
| 6.2 | 1-246-420-00 | 62 | 1-246-444-00 | 620 | 1-246-468-00 | 6.2k | 1-246-492-00 | 62k | 1-246-516-00 | 620k | 1-246-540-00 | | |
| 6.8 | 1-246-421-00 | 68 | 1-246-445-00 | 680 | 1-246-469-00 | 6.8k | 1-246-493-00 | 68k | 1-246-517-00 | 680k | 1-246-541-00 | | |
| 7.5 | 1-246-422-00 | 75 | 1-246-446-00 | 750 | 1-246-470-00 | 7.5k | 1-246-494-00 | 75k | 1-246-518-00 | 750k | 1-246-542-00 | | |
| 8.2 | 1-246-423-00 | 82 | 1-246-447-00 | 820 | 1-246-471-00 | 8.2k | 1-246-495-00 | 82k | 1-246-519-00 | 820k | 1-246-543-00 | | |
| 9.1 | 1-246-424-00 | 91 | 1-246-448-00 | 910 | 1-246-472-00 | 9.1k | 1-246-496-00 | 91k | 1-246-520-00 | 910k | 1-246-544-00 | | |

## HARDWARE NOMENCLATURE

**Screw:**




**Nut, Washer, Retaining ring:**




| Reference Designation | Shape | Description | Remarks |
|---|---|---|---|
| **SCREWS** | | | |
| P | | pan-head screw | binding-head (B) screw for replacement |
| PWH | | pan-head screw with washer face | binding-head (B) screw and flat washer for replacement |
| PS<br>PSP | | pan-head screw with spring washer | binding-head (B) screw and spring washer for replacement |
| PSW<br>PSPW | | pan-head screw with spring and flat washers | binding-head (B) screw and spring and flat washers for replacement |
| R | | round-head screw | binding-head (B) screw for replacement |
| K | | flat-countersunk-head screw | |
| RK | | oval-countersunk-head screw | |
| B | | binding-head screw | |
| T | | truss-head screw | binding-head (B) screw for replacement |
| F | | flat-fillister-head screw | |
| RF | | fillister-head screw | |
| BV | | braizer-head screw | |

| Reference Designation | Shape | Description | Remarks |
|---|---|---|---|
| **SELF-TAPPING SCREWS** | | | |
| TA | | self-tapping screw | ex: TA, P 3 x 10 |
| PTP | | pan-head self-tapping screw | binding-head self-tapping (TA, B) screw for replacement |
| PTPWH | | pan-head self-tapping screw with washer face | binding-head self tapping (TA, B) screw and flat washer for replacement |
| PTTWH | | pan-head thread-rolling screw with washer face | binding-head (B) screw and flat washer for replacement |
| **SET SCREWS** | | | |
| SC | | set screw | |
| SC | | hexagon-socket set screw | ex: SC 2.6 x 4, hexagon socket |
| **NUT** | | | |
| N | | nut | |
| **WASHERS** | | | |
| W | | flat washer | |
| SW | | spring washer | |
| LW | | internal-tooth lock washer | ex: LW3, internal |
| LW | | external-tooth lock washer | ex: LW3, external |
| **RETAINING RINGS** | | | |
| E | | retaining ring | |
| G | | grip-type retaining ring | |



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